APPLICATION

of

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for

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on

METHOD FOR MAKING DRYWALL BEAD WITH KNURLED PAPER FLAPS

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METHOD FOR MAKING DRYWALL BEAD WITH KNURLED PAPER FLAPS

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to drywall finish trim devices typically utilized in finishing a drywall installation at a corner joint or other terminus.

Description of Related Art:

Building construction over the years has typically involved framing to form a framework of vertical studs and cross members. Previously it was known to cover the studs with vertically spaced apart, horizontal slats, known as lath, and then to cover such slats with plaster troweled in place by a craftsman to provide a smoother finish. Plaster finishing was a very demanding task requiring skill and experience. While enjoying popularity, it was believed there were problems of one lath and plaster walls shifting relative to another thus cracking and irregularities in the product. In recognition of the perceived problem, various types of corner fittings were proposed, including a rolled metal expansion strip having a pair of separator ribs radiating outwardly at 90° to one another to form cylindrical rolls having their respective outer extents disposed at the outer surface of the plaster layer so that the outer surface of plaster trapped therebetween, when troweled evenly into the ribs, will form a 45° finish chamfer. The vertical strip of plaster trapped between the ribs is then separated from that covering the lath in the adjacent walls. An expansion device of this type is shown in the 1934 U.S. Patent No. 2,012,203 to Peterson. It was contemplated that this expansion bead was to be nailed in place on the lath construction. To my knowledge such a device never gained broad acceptance in the lath and plaster construction field, and is not adopted to use as a tape or bead for drywall construction. Absent the nail

holes incorporated in the metal flange, there is no means for anchoring the fitting to joint compound on the interior of the fitting so as to, when cured, anchor the fitting firmly in place.

Drywall construction allows the drywall hanger to easily cut the panels to many different shapes and sizes for assembly and hanging from the building frame. However, workmen face a challenge in finishing drywall panels at an edge or corner. It is very difficult, if not impossible, to cut the edges of such panels with the precision, straightness, and smoothness required to abut the edges of adjoining panels in a sufficiently straight corner to provide an aesthetic finish. Additionally, cut edges expose the soft, raw cores of the drywall panels, thus requiring some sort of covering or treatment to afford a finished appearance.

As a result, several different devices and techniques have been developed in effort to produce a structurally sound corner or other joint that exhibits a smooth and seamless intersection. Devices proposed to achieve this result include drywall tape, trim and corner beads. Conventional drywall tape may be applied to the joints and edges of abutting panels to be covered by wet joint compound that is feathered and smoothed to cover the newly created seams. When the joint compound has dried, the tape and drywall can be sanded, painted, covered, or otherwise finished in whatever manner is desired. A great deal of skill is required, however, to apply and form the joint compound to create a sufficiently straight intersection that will exhibit, when taped and sanded to a finish, no evidence of scuffing and tearing in the tape.

In light of the limitations on use of drywall tape to trim a joint, trim strips or corner beads are often utilized to cover a joint and produce a seamless and aesthetically pleasing edge trim or intersection at the corners of drywall panels.

Such trim strips may take many different configurations and are typically in the form of an angle corner bead having diverging flanges or may be, for instance, a J strip to cap the edge of a dry wall panel. For the purposes of this invention, the particular configuration is not critical and use in conjunction with numerous different

configurations is contemplated. For instance, the trim may be flat or configured with any one of a number of well known configurations, including corner trim with perpendicular flanges, corner trim with a rib formed at the juncture of the flanges defining a bead, flanges angled at 135° to one another, those configured with somewhat of a Z shape, those with soft line or rounded corners, and those with offsets or other configurations traditionally used in the trade and known to those skilled in the art.

Drywall corner fittings take many configurations and those for right angle corners typically incorporate cores with orthogonal flanges. The flanges may joint at a sharp 90° corner or may be formed with a rounded rib defining a bead raised from the exterior surfaces of the flanges to define a raised edge or bead. Drywall construction finishing is sometimes referred to collectively as beads and typically fall into the category of nail or tape-on beads. One common feature of many of the nail trim strips or corner beads is the use of a rigid or semi-rigid core fittings that caps the drywall corner joint to provide support and to prevent the drywall from being chipped or cracked along the otherwise exposed edges of the panels, typically incorporating nail holes for nailing in place. Typical materials known and used in the art for such cores include galvanized steel, aluminum, plastic, and sometimes stiff, thick paper. It has been proposed to serrate the exterior of a metal core to provide a roughened surface to enhance attachment of compound to such exterior. Beyond the fact that these so called nail-on beads must be nailed in place, is the disadvantage that the drywall joint compound applied to the corner joints to complete the assembly may not readily adhere to such rigid and semi-rigid materials or may easily conceal nail or screw heads, making it difficult to cover, sand, paint or otherwise finish out the corner joint in an aesthetically-pleasing manner.

Efforts to overcome the shortcomings of metal beads have lead to extruded one piece nail-on plastic beads with a thick core and integral thin flaps constructed with nail holes. To facilitate the joint compound in adhering to the outer surface of the outer surface of the flanges, it has been proposed to form such outwardly facing

surfaces with striations much like record grooves and spaced bodily from the thicker core. A device of this type is shown in U.S. Patent No. Re 34,547 to Weldy. While satisfactory for some application as a nail on drywall bead, such devices do not function well as a tape-on styled bead without such nailing.

To enhance the function and finished appearance of such drywall corner beads, a covering of some other material such as paper or fabric has been employed. The challenge is to provide such an exterior covering that is substantial enough to secure the inner core in position while being thin enough to create a smooth transition between the cover and the underlying drywall. One bead developed to address some of the problems with the prior art is a corner bead with a metal core, covered on its exterior with a paper cover which projects beyond the opposite lateral edges to form flexile, flaps. Such flaps, projecting beyond the edges of the flanges, can serve to form a smooth transition over such edges, and have been proposed to anchor the bead in place. Stock paper had the advantage that frayed fiber ends would facilitate adherence to the joint compound as it covered. The problem was that the frayed ends would project outwardly from the outer surface and would, upon sanding to finish, compound applied thereover, project through the compound as unsightly surface. By impregnating the paper throughout with latex, it was believed that the fraying could be reduced and the paper strengthened. It was proposed that the core be covered with wallboard grade paper and that it be impregnated with latex to make the paper resistant to scuffing and such fraying. It was perceived that this construction exhibited poor joint compound bonding properties, thus subjecting it to unwanted peeling. Devices of this type are shown in U.S. Patent Nos. 5,613,335 and 5,836,122, both to Rennich. In effort to improve bonding properties, it was proposed to construct a tape-on bead with a stock paper having a high resistance to abrasion, such as backing used in commercially available sand paper. It was perceived that any deficiency in bonding could be overcome by abrading the surface of the paper to loosen the surface fiber in effort to improve the bonding to the surface of the wallboard. A bead of this type is

shown in U.S. Patent No. 6,295,776 to Kunz. In effort to improve the strength of bond to the joint compound, the flat flaps were formed with small holes so compound applied to the exterior would flow through. While such fraying of the fibers may, in fact, serve to resist peeling, experience has shown that the flat bead that Kunz proposed, a drywall fitting with a classic raised bead at the juncture between its two flanges to serve as a straight edge for application of compound to the exterior of the flanges. In any event, until now craftsmen have been forced to select between nail-on or fitting which are time consuming to install or tape-on fittings having flat paper flaps which do not bond well into the compound thereby being susceptible to pulling free from the cured joint with only minimal forces being applied thereto.

It has been common practice to apply joint compound, often referred to in the field as mud, to the interior surfaces of the core and the flanges prior to installation on a drywall corner. This compound then acts as an adhesive to help hold the bead temporarily in place while it is nailed or compound is applied to paper flaps and is available to flow through holes in the flanges or to adhere to the interior surfaces of paper flaps.

Thus, there exists a need for a tape-on drywall bead which is inexpensive to manufacture and which incorporate paper flaps constructed to be securely anchor in place by joint compound applied under such flaps. With the enhanced anchoring capabilities, it would also be helpful if such flaps were strengthened against unwanted separation of the paper flaps when forces are applied to the core tending to force it away from the drywall. The present invention is directed to just such a drywall bead.

SUMMARY OF THE INVENTION

The present invention provides a drywall bead which is convenient to install and still effective to attractively cover and protect the drywall panel joint. The drywall joint assembly strip device of the present invention is characterized by a lengthwise,

longitudinal flexible flap projecting from at least one side of a core and configured with longitudinal grooves and ridges to provide a mechanical anchor in the joint compound on the underside thereof when covered therewith. In this regard, such grooves and ridges being formed on the interior side of the flaps can be particular effective in taking advantage of the joint compound, once cured, to firmly anchor the bead in position. In one aspect of this invention, the paper flaps are constructed of paper fibers mixed with strengthening compound at the time of manufacture. This serves to not only bond the fibers in place against abrading or fraying when during finish sanding the layer of covering compound is sanded through.

The strip device core is generally elongate and has exterior and interior surfaces. Preferably, a continuous cover having a width greater than the width of the core is bonded to the core's exterior surface such that the edges of the cover extend beyond the longitudinal edges of the core to form flexible flaps. As such, the lengthwise, alternating grooves and ridges are then formed along the flaps in a secondary operation. In one embodiment, lengthwise, spaced-apart perforations are formed along the grooves as well, as by knurling.

In use, then, the flaps of the drywall joint assembly strip device of the present invention provide flexibility about the longitudinal edges of the core, while the grooves and ridges cooperate to provide linear stiffness along the length of the flaps to maintain them flat during installation so that the device is convenient to use. In this regard, grooves and ridges, when embedded in the joint compound, serve to facilitate anchoring of the device in place in covering relationship over the joint. Additionally, in embodiments where the flaps are knurled with perforations of sufficient size for flow of the joint compound, such compound, when cured, will form a plurality of small columns or posts through such perforations to facilitate the anchoring of the flaps. Finally, by placing such perforations in the grooves formed in such flaps, the grooves themselves will serve to direct the joint compound through the spaced-apart

perforations to the underside of the flaps to thus create a series of respective bridges through such flaps defining respective anchoring posts.

Other features and advantages of the invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the features of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a partial perspective view of a drywall bead device embodying the present invention;

FIG. 2 is a transverse sectional view, in enlarged scale, taken along line 2-2 of FIG.1;

FIG. 3 is a detailed view, in enlarged scale, taken from the oval identified by the numeral 3 in FIG. 2;

FIG. 4 is a perspective view, in reduced scale, of the drywall bead device shown in FIG. 1, partially in section, and covering a corner joint;

FIG. 5 is a detailed view, in enlarged scale, taken from the oval identified by the numeral 5 in FIG. 4; and

FIG. 6 is a partial perspective view, in reduced scale, of a method of producing the drywall bead device shown in FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the drawings for purpose of illustration, the present invention provides generally for an improved drywall bead 10 that is comprised of an elongate core 20 having a cover 40 bonded to the outside surface thereof to extend beyond the longitudinal side edges of the core to provide flexible flaps 50 in which longitudinal grooves 56 and ridges 58 are formed. Some embodiments include a longitudinal pattern of compound communicating perforations 60. While the present invention is described and depicted in detail as a drywall bead having a core with a curved cross-section and mounted on the typical vertical drywall corner joint, it will be appreciated by those skilled in the art that the invention can be used in conjunction with cores of most any cross-section on virtually any drywall joint.

Referring to FIGS. 1 and 2, in one embodiment elongate core 20 is formed having a generally curved transverse cross-section to form what is known as a bull nose shape defining a convex outer surface 22 and a concave inner surface 24. The elongate flanges 26 project laterally beyond the longitudinal edges of the core. In the embodiment of the strip device shown, transitions are formed at the opposite sides of the bull nose curve to define slight bends serving to direct the respective flanges outwardly away from each other at an angle of about ninety degrees. The core may be made of a number of rigid or semi-rigid materials such as galvanized steel, aluminum, and a variety of plastics, including vinyl, nylon, and PVC. In a preferred embodiment, I have found that flaps formed with a plurality of parallel groove 56 and ridges 58 formed on the opposite sides thereof perform satisfactorily. A representative embodiment is formed with the grooves spaced laterally apart a distance of about 1/8th of an inch and the ribs formed to bow outwardly in transverse cross section as described below. Thus, once embedded, such ribs present respective barriers against lateral shifting of the respective flanges relative to the joint compound embedded in the

respective grooves. Depending on the material selected and the core cross-section desired, the core may be formed through a variety of processes known in the art, including casting, molding, extruding, or roller-forming.

The elongate cover 40 is configured having a length substantially equal to that of the core 20 but with a greater transverse width. It is preferably made of a paper material, but may be made of other thin, flexible materials such as textiles and synthetic fabrics. In the preferred embodiment, the selected material is to have sufficient tensile strength to resist tearing or chafing, while being sufficiently flexible to facilitate installation, all the while having absorptive and surface characteristics that allow it to be effectively bonded both to the core and to a drywall surface and to, upon curing of the joint compound, provide an appearance complimentary to that of the adjacent drywall surface. It has been discovered that, in one embodiment these objectives are satisfied in a paper cover fabricated by mixing fibers and strengthening compound to encapsulate the fibers with a thin film and then combining three or more layers of such a film to produce a tear- and temperature-resistant paper cover material, as described in copending U.S. Patent Application Serial Number 09/825,766, filed on April 3, 2001, and now U.S. Patent No. . While ideal for this application, it will be appreciated by those skilled in the art that other conventional stiff paper such as the covering paper typically used to cover the surface of drywall panels will suffice in this invention.

The paper defining the cover 40 is bonded to the outer surface 22 of the formed core 20, using a hot melt glue or other such adhesive known in the art. Such cover is wider than such core so that the opposite margins 42 project laterally beyond the longitudinal edges 30 of the core to form the flaps 50. In one embodiment, such cover is bonded centered on the core so that the flaps are symmetrical on the opposite sides thereof. Generally, the cover is rectangular and positioned so that the longitudinal edges extend parallel to the respective longitudinal edges of the core. By extending beyond the edges of the underlying rigid core, both the outwardly-facing surfaces 52

and inwardly-facing surfaces 54 of the flaps are exposed free of such core. Referring to Figs. 2 and 3, compound applied to the underside surface 54 of the flaps will, when cured, firmly affix the bead in place. Based on the grooved construction described, and with the flaps constructed of fibrous stock material mixed with strengthening compound, it will be appreciated that the flaps may be formed with a relatively straight longitudinal configuration and will resist flexing along the longitudinal plane while still being somewhat flexible relative to the longitudinal edges of the core to facilitate conforming to the drywall as they project from the opposite edges of such core. Thus, this preferred embodiment offers the advantage that the flaps are constructed to allow joint compound to be applied to the under surface 54 prior to mounting to the drywall corner, as shown in Fig. 4, while the configuration of the longitudinal ridges provide support against flexing from the respective longitudinal planes of the respective flaps, thereby maintaining relatively straight longitudinal flaps to engage against the straight surface of the underlying drywall.

Referring now to FIG. 3, the elongate, flexible flaps 50 are configured along their length with parallel grooves 56 and ridges 58. The ridges 58 are interposed lengthwise between the grooves 56, and are generally parallel to them. In one embodiment, three grooves and four ridges are formed in each flap. As noted, such lengthwise grooves and ridges cooperate to serve the purpose of reinforcing ribs and to provide linear stiffness for the flaps, thereby serving to reinforce against flexing out of the longitudinal plane to minimize longitudinal fluting or waviness in such flaps along their respective lengths while still allowing each flap to bend or flex relatively freely about an axis parallel to the respective longitudinal edges 30 of the core 20. It will be appreciated that this configuration maximizes the workability of the drywall joint assembly strip device 10 of the present invention, as the flaps are held straight in the longitudinal direction but are free to flex about vertical axes to lay down flat over the marginal edges of the joining drywall panels.

With continued reference to FIG. 3, in the preferred embodiment the spaced-apart perforations 60 are formed of sufficient size to communicate uncured joint compound between the outwardly-facing surfaces 52 and the inwardly-facing surfaces 54 of the flaps. In a preferred embodiment, I have found these perforations formed in longitudinal grooves arranged in a uniform pattern and having an opening of about 1/64 of an inch wide, about 1/16 of an inch long and spaced longitudinally apart about 3/32 of an inch from end to end work well. In this embodiment the center of the respective ribs 58 (Fig. 2) rise up about 1/64th of an inch from the bottom of the respective grooves thus making such its respective grooves about that deep. As will be appreciated by those skilled in the art, the cross sectional area of such perforations and density thereof may vary, it only being important that they allow for flow therethrough of the compound of the particular viscosity to be used to complete the joint and that such perforations be sufficiently dense in the flap to provide for a sufficient number of resultant compound posts to securely anchor the flap in the finished joint. The cross sectional area of such perforations for use with conventional compound can vary from about .0006 to about .05 square inches or even more depending on the characteristics of the compound used. The side walls of the ribs taper toward the grooves and the perforations themselves are generally tapered to narrow from the outside to the inside surface (Fig. 3), such that the opening of each perforation at the outwardly-facing surface is larger than the opening where each perforation intersects the inwardly-facing surface to compliment the shape of tapered side walls of such ribs in providing a funnel effect inwardly toward the body of the respective drywall panels. It will be appreciated that, as discussed below in more detail, in use, the grooves, ridges, and perforations cooperate to conveniently effectuate the installation of the joint assembly strip device 10 over a drywall corner joint.

Referring now to FIGS. 4 and 5, a typical drywall corner joint consists of a first drywall panel 90 and a second drywall panel 92 being mounted vertically to meet at a corner at approximately right angles to one another. The panels are installed on an

internal wall support structure 94, such as framing, studs, joists, furring, or other such support structure known in the art, using a conventional fastening technique, such as nails, screws, or adhesives. The panels are configured to be substantially planar, such that the first drywall panel has a first exterior surface 96 and the second drywall panel has a second exterior surface 98 wherein both exterior surfaces face outwardly away from the building frame. The panels are further configured such that a first vertical edge 100 and a second vertical edge 102 of the respective first and second panels meet at right angles to form a drywall corner joint 104.

In use, the drywall joint assembly strip device 10 of the present invention is installed vertically in covering relationship over the drywall corner joint 104 such that the concave interior surface 24 of the core 20 is adjacent to the corner joint. Typically, the strip device is cut to a length substantially equal to the length of the corner joint so as to completely cover and protect the entire corner joint. Wet drywall joint compound is applied to the interior or exterior surface of the strip and blended with the strip device 11 whether manually or by an applicator. As has been common practice in the field, the bead may be run through a conventional applicator to apply joint compound to the interior surface 54 to cause such compound to, when the bead is positioned on the corner joint 104, adhere the bead temporarily in place. The strip device is then applied to the desired corner joint 104, with the joint compound adhering it in position while a finishing layer compound may be applied to the exterior drywall surfaces all along the joint using a conventional troweling or other such technique known in the art in order to produced a smooth, aesthetically-pleasing, finished corner joint. As the joint compound cures, the flaps 50 will be held firmly in position by such compound itself forming mirror images of the ridges and grooves in the surface 54.

It will be appreciated by those skilled in the art that several beneficial and novel features of the drywall joint assembly strip device 10 of the present invention become evident in the installation process. First, as the strip device is positioned over the corner joint, the lengthwise grooves 56 and ridges 58 formed in the flaps 50 serve to

provide linear stiffness so that the flaps minimize any waviness or fluting along their respective lengths. This allows the worker to easily vertically align the strip device over the drywall corner joint with such flaps relatively flat on the drywall surface. Moreover, because the grooves and ridges are configured lengthwise and generally parallel to the longitudinal edges 30 of the core 20, the flaps are still free to bend and flex and curve relative to their respective vertical planes. In this way, the grooves and ridges cooperate to provide both the flexibility relative to the edges of the core and the linear stiffness needed to allow a worker to position the strip device on the drywall corner with such flaps flat against the drywall surface while he or she applies the joint compound over such flaps to anchor them to the drywall panels themselves.

Second, on the respective one sides of the flaps, the joint compound will be worked into the grooves 56 between the ridges 58 to create compound ribs and will be worked into the undulations formed by the ridges on the opposite sides of such flaps to thus cooperate in mechanically trapping such flaps in the joint compound to anchor them solidly in place.

Third, for those embodiments where the perforations 60 are formed in spaced-apart relationship along the flaps 50 they provide for the wet joint compound to actually flow through to the inwardly-facing flap surfaces 54 and the underlying drywall exterior surfaces 96 and 98 to enhance the communication of compound from one side to the other and to construct small pins or posts in the respective such perforations. In this way, when the joint compound dries and cures, the drywall joint assembly strip device 10 is integrally locked in place by the mechanical entrapment of the ribs and grooves and also by the compound posts through the perforations.

A fourth beneficial installation feature of the drywall joint assembly strip device 10 relates to both the parallel grooves 56 and ridges 58 and the perforations 60. It will be appreciated that as wet joint compound is applied to the outwardly-facing surfaces 52 of the flaps 50, the grooves and ridges in the flaps cooperate to direct moisture along the grooves and into the perforations. Thus, the grooves, ridges and perforations

cooperate to more effectively direct the wet joint compound toward the flaps' inwardly-facing surfaces 54 and the underlying exterior surfaces 96 and 98 of the drywall panels.

The drywall corner joint is finished out by applying and smoothing, or feathering, a sufficient amount of wet joint compound to the exterior surfaces of the drywall joint assembly strip device 10 so as to completely cover the strip device and blend the compound with the exposed exterior surfaces 96 and 98 of the drywall panels.

It will be appreciated that the drywall joint assembly strip device 10 of the present invention, with its longitudinally grooved flaps, provides for effective and efficient installation onto a typical drywall corner joint. For those embodiments with the knurling is operative to form perforations for communication of compound, the anchoring posts formed therein will further facilitate the anchoring function. Furthermore, it will be appreciated by those skilled in the art that any number of core configurations may be formed in producing the strip device described, causing the device to be versatile and suitable for use in a wide variety of drywall joint applications.

In an exemplary embodiment, the grooves 56, ridges 58, and perforations 60 on each flap 50 of the drywall joint assembly strip device 10 of the present invention are formed in a single operation. As shown in FIG. 6, one such means for forming all three features in one step is a mating roller device, or knurling machine 70. The machine generally has two parallel shafts aligned in a vertical plane: an upper shaft 72 and a lower shaft 74. An upper roller 76 and a lower roller 78 are mounted in rolling contact on the distal ends of the upper and lower shafts, respectively. The upper roller is configured with one or more axially spaced-apart circumferential rings 80 having radially spaced-apart pyramidal spikes, or knurling points 82, thereabout. The lower roller is configured with axially spaced-apart circumferential channels 84 positioned to accommodate the spiked rings of the upper roller.

The upper and lower shafts 72 and 74 rotate in opposite directions relative to one another, so that the upper roller 76 and lower roller 78 turn on each other and allow the flaps 50 to be fed between them one at a time. The shafts may be manually rotated or be driven by the knurling machine. In either case, a dry paper flap may be fed between the mating, rotating rollers to pass between them such that its outwardly-facing surface 52 faces the upper roller so that each ring 80 on the upper roller forces the flap material into the corresponding channel 84 on the lower roller to permanently deform the paper and form the respective grooves 56. At the same time, in those embodiments which are perforated, knurling teeth define points 82 to make multiple punctures in the respective flap along each groove to form the spaced-apart perforations 60. The flap material is forced by the rings into the engaging channels with sufficient force to permanently deform the paper forming such flaps to define on one side thereof high areas, defining the ridges 58, on either side of each groove. In this way, through a single operation, a knurled surface comprised of lengthwise grooves, ridges, and perforations is permanently formed along the outwardly-facing surface of each flap, thus completing the strip device 10. Therefore, it will be appreciated by those skilled in the art that the drywall joint assembly strip device of the present invention is capable of being produced in a convenient and cost-effective manner by being made of relatively common and inexpensive materials and by employing methods that are efficient and utilize equipment that is generally known in the art.

The bead device of the present invention has been well received in the market place and is preferred by many over prior art beads devices. It will be appreciated that it provides an effective and economical strip device for covering and protecting an underlying drywall joint. The strip device may be formed in many different configurations to suit a variety of drywall joint applications, and optimizes the ease and effectiveness of installing the strip device on a drywall joint through its novel flexible

flaps projecting laterally beyond the respective flanges of the core and having lengthwise grooves and ridges to be anchored into joint compound as it cures.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention.